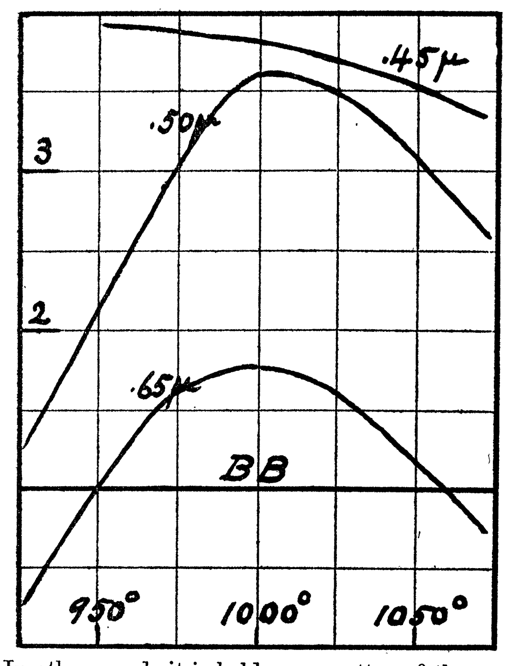
SPECIAL ARTICLES

EMISSION BANDS OF ERBIUM OXIDE: A CONFIRMATION

IN a paper by the late Professor W. G. Mallory[1], published in 1919, a photometric study of the spectrum of glowing erbium oxide was described. When the oxide was heated to 1,000 degrees Centigrade three regions, in which the principal emission bands of this interesting spectrum are situated, were found to be brighter than the corresponding wave-lengths in the spectrum of an ideal black body at the same temperature; the red region slightly brighter and the green and blue several times brighter.

This result has been questioned, although not so far as we are aware in print, on the ground that no radiator can exceed the emission of a black body of the same temperature.



In other words it is held, as a matter of thermodynamics, that the brightest regions in the spectrum of a selective radiator may reach, but never reach beyond, the envelope which encloses the area representing the distribution of radiation from a black body of the same temperature. The explanation offered in Mallory's paper suggests luminescence of the incandescent oxide superimposed upon the ordinary radiation due to temperature.

In the course of studies now in progress, in which an altogether different method is used[2], we find many instances of luminescence superimposed upon the ordinary temperature radiation of incandescent oxides and producing intensities greatly in excess of those of the same regions in the spectrum of the black body. Moreover in the case of erbium oxide we find these excesses in the same regions and at the precise temperature designated by Mallory.

The accompanying figure is from our data for the three regions in question and covers temperatures slightly below 1000°. Intensities are in terms of the brightness of the corresponding radiation from a black body of the same temperature as the oxide and are thus directly comparable with Mallory's results.

While the sample of erbium oxide used by us did not happen to be quite as actively luminescent as in Mallory's experiment the effect is there and is of the same order. His observations are corroborated in every essential respect.

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[1] Mallory: *Physical Review* (2) XIV p. 54.

[2] To be described in a forthcoming paper.

LABORATORY DETERMINATIONS OF DIP AND STRIKE

The writer has observed that many geology students are unable to make correct determinations of dip and strike. This weakness seems to be due to the difficulties of presenting the subject in the field, to lack of sufficient laboratory training before entering the field, and especially to lack of suitable apparatus. In the field, the determination of dip and strike appeals to the student as a very minor and uninteresting detail in comparison with the other geological features to which his attention is called. Furthermore, the rock surfaces are usually so irregular that the instructor can not make a very close check of the student's readings. In the laboratory, the tilted drawing boards, table tops, or rock slabs commonly used are not very efficient because they often possess straight edges indicating the line of strike and are usually so insecurely fastened